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DATE 11 July 1961

NO OF PAGES 202

CONVAIR ASTRONAUTICS

CONVAIR DIVISION OF GENERAL DYNAMICS CORPORATION

CENTAUR SUBSISTEM NO. 2

TELEPAK ASSERBLY

FLIGHT CERTIFICATION TEST

REPORT MINUSER 558 636-1

GENERAL DYNAMICS

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INTRODUCTION:

The Telepak Assembly Unit is a device which converts instrumentation measurement signals into 0-5 VDC inputs to voltage controlled oscillators.

CRIECTIVE

The test objective is to determine the ability of the signal conditioning portion of the Telepak Assembly to comply with the requirements, of test procedure 558636.

Additional testing was conducted to solve cannister shock mount problems which arose during vibration tests.

COMCLUSIONS:

0

The signal conditioning portion of Telepak Assembly Unit 55-13903-500, 8/H 1 passed flight proofing tests with several major exceptions. Differential amplifier 55-01120-1 failed while the package was being subjected to radient heating and had to be replaced. Rubber 0 rings used on the shock mounts failed four times during 8G simusoidal vibration tests. An 8G sweep along the I axis of Marcury specimen 27-12290-1, 8/H 1 damaged its 0 rings (see Figures 1 and 2). O rings were replaced with rubber inserts to solve the vibration problem. The test specimen failed to comply with applicable sections of radio interference specification MII-I-26600.

Minor problems included failure of several medule output veltages to meet design specifications and an 800 cps noise voltage on the 28 VDC bus. Several output signals drifted as testing progressed. Some medules were affected by severe environments.

RECOGNIZIONS:

It is recommended that rubber inserts, properly comented to the canniator per vendor instructions be used in place of the 0 rings until more information can be obtained concerning the problem. Steps should be taken to climinate the 800 ops noise problem.

SPECIME

Contour specimen 55-13503-500, S/H 1 was used for tests called out in the procedure. Additional vibration tests were performed with Nervery specimen 27-12290-1 S/H 1.

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TEST PROCEDURE:

Test Procedure 55B 636, used in this test, is included in Appendix A.

TEST RESULTS:

Initial Satisfactory Perfermance Test: Several transducer power supply outputs did not comply with the specifications. The demodulator output voltage was about 250 mv lew for each input. This might have been due to a leading down of the 2.5 VDC bias voltage. The crystal rectifier performed satisfactorily. Maximum test input to the DC section was 30.25 VDC as any larger veltage might have demaged other modules connected to the 28 VDC bus. The commutator power supply apparently was feeding an 800 cycle signal ente the 28 VDC bus.

As a result, most other modules had a 100-200 my noise compenent on the output signal. The other modules perfermed satisfactorily. These results were brought to the attention of the design group and testing was continued.

Assoluration: The specimen was subjected to 10.0 G assoluration for at least 30 seconds in each direction along each axis and passed these tests satisfactorily.

Altitude: An attempt to reach an altitude of 10⁻⁵ mm of Mg, did not proceed beyond 2.0 xl0 ⁻⁴ mm of Mg due to leakage problems. The specimen operated satisfactorily throughout the test.

Temperature-Municity: The specimen was subjected to radiant heating as called out in Paragraph 5.5-a of the precedure.

Maximum non-operating temperature was found to be 133°P. A visual inspection of the unit revealed that several openy beards in the package ware starting to warp and that one had a slight crack. A proof cycle showed that differential amplifier, 8/N 113 had no output voltage. This amplifier was replaced with 8/N 112 and testing was continued. A proof cycle after precedure Paragraph 5.5-b (-30°P) showed that AC section outputs of the crystal rectifier were 0.5-0.6 VDC tee high. Function tone generator outputs 7, 8, 9 and 10 were 20 cps too high.

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TEST RESULTS: (Continued)

The specimen was returned to 80°F. At this temperature all function tone generator outputs were normal. Crystal rectifier outputs were still 0.4-0.6 VDC high and remained high during subsequent tests. A proof cycle at 110°F and 95% relative humidity revealed that several commutator segments had become noisy. Amplifier gains of Ch 7 and 8 were low and remained low during the following tests. The calibrator module would net operate at this time, but worked satisfactorily during the proof cycle of Section 5.5-d (40°F and 95% relative humidity). Several transducer power supply voltages were not within limits at this point.

A proof cycle after temperature shock tests revealed that the negative gates of all commutated channels were at -1.0 VDC instead of -1.25 VDC. A visual inspection of the specimen components after the series of tests revealed that epoxy beards were varying more and expected metal was beginning to rust. These results were brought to the attention of the design group before testing was continued.

Vibration: The specimen was subjected to 8 0's simusoidal vibration along each axis. The \$ axis sweep was completed satisfactorily. (See Figure 3 for the axes designations). The I axis sweep progressed to 97 eps at which point the sheek mount 0 rings were worn very badly. They were replaced and a special sweep began at 50 cps. The 0 rings started to wear badly at 68 eps but held until the sweep was completed. At the start of this sweep the differential amplifier (S/N 112) output of Ch 8 fell off, but returned during the sweep. The demodulator output amplitude fluctuated during this sweep.

The O rings were replaced and an X axis sweep progressed to 18 cps. At that point the O rings were very badly worn and replaced. The next sweep was begun at 100 cps and progressed to 2000 cps without incident. Then a sweep was started toward zero from 100 cps and proceeded to 68 cps. At 68 cps the package was receiving 72 Q*s and the O rings were in very bad condition. He further vibration was done using this specimen. The shock mount seats, Astronautics machined, were worn and may have contributed to rapid deterioration of the O rings. At this point the signal conditioning portion of the specimen was working satisfactorily. A loose screw on the VCO module veltage regulator was noted upon visual inspection of the specimen.

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TEST RESULTS: (Continued)

To obtain more data and determine if test specimen shock mount seats might have been impreperly machined, a Project Margury Specimen (27-12290-1, S/N-1) was subjected to an I axis sweep. This specimen had an R.F. section installed whereas the original test specimen contained a dummy mass and electrical lead. The Mercury specimen was machined entirely by the vender and had successfully passed vender vibration tests. The I axis sweep was completed to 2000 eps although the O rings were bedly werm at 100 ops (see Figures 1 and 2). At 68 cps the specimen experienced a maximum G level -18G. These results were brought to the attention of the design group and the vendor. The vendor indicated improper 0 rings, made of teo soft a rubber had been used. A vender supplied, rubber insert was gluid to the specimen and used in place of 0 rings at each mounting hole. The specimen was then subjected to a 0-2000 spe vibration sweep along each axis. Both shock mounts and rubber inserts were intect after the three sweeps. The rubber inserts were only slightly worn. Mounting plate G levels were monitored at the four shock mount locations. The shaker input was controlled to keep the G level of all four legations at not more than \$G's. When using 0 rings, most of the damage occurred during I and Y axis sweeps around 70 eps. Damage when using inserts cocurred mainly during I axis vibration at about 174 eps. Figure 3 shows the setup for the Z axis sweep using rubber inserts.

Radio Interference: The specimen was subjected to and failed to pass the MIL-1-26600 requirements for conducted interference, radiated interference and audio susceptibility. Tests were conducted by Department 551-7 and complete results published in Test Report AE61-0377.

Life Test: With all power, signals and leads applied, the specimen was operated in cycles of 5 hours "en time" and 1 hour "eff time" until 500 hours of "on time" had been accommlated. The specimen performed satisfactorily during the 500 hours with one exception. At 440 hours the transducer power supply 8.8 VDC (adjustable) output fell off to 2.2 welts and varied from 2-5 volts during the remainder of the test. He further changes were noted in signals that had shifted during provious tests.

FOTE:

The data from which this report was prepared is recorded in Astronauties Engineering Test Laboratories Notebook Number 7611.

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5.2 I.S.P.T.

Reference Paragraph 5.2.2 Transducer Power Supply Test Test Eng. R. H. TRoester Witness C. Naufly USAF Witness Start Time 409.0 End Time 999.0

**************************************	. agar . ayadi kunyadiki digadakiga pikisia alipendigala sebiga unya salitekaginsa a da sebili di		
Input Voltage (Volts IC)	24.75	27.50	30.25
Output Voltage Limits (Volta DC)	-5.94 to -6.06	-5.94 to -6.06	-5.94 to -6.06
Meter heading	- 5.839	-5.849	-5.867
Output Noise Level (Volts AC) Meter Reading	0.04 Max 3.02 #	0.04 Nex 0.02 4	0.04 Max 0.02 +
Lie cet (reserving	200 mur spiles	200 nm spikes	200 mur spikes
Output Voltage Limits (Volts DC)	-1.21 to -1.27	-1.21 to -1.27	-1.21 to -1.27
Meter Reading	- 1.228	-1.230	-1.233
Output Noise Level (Volts AC)	0.04 Max 0.02 +	0.04 Max 0.02 +	0.04 Mex 0.04+
Meter Reading	90 mm spikes	90 my soikes	90 morsochio
Output Voltage Limits (Volta DC)	2.494 - 2.506	2.494 - 2.506	2.494 - 2.506
Meter Reading	2.533	2.533	2.533
Output Noise Level (Volts AC)	0 .02 Max 0.02 ≠	0.02Max	0.02 Mess
Meter Reading	100 mer soules	100 mor spikes	110 mr sikes
Output Voltage Limits (Volta DC)	4.999 - 5.001	4.999 - 5.001	4.999 - 5.001
Heter Reading	5.079	. 5.079	5.079
Output Noise Level (Volts AC) Meter Resding	0.02 Max 0.03 +	0.02 Max 0.02 5 4	0.02 Max
	90 mm spikes	90 mr spika	90 om soiles

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(Continued) I.S.P.T.

Reference Paragraph 5.2.2

Transducer Power Supply Test (Continued)

		,	
Output Voltage Limits (Volts DC)	5.0 - 5.2	5.0 - 5.2	5.0 - 5.2
Meter Reading	5.140	5.146	5.158
Output Noise Level (Volts AC)	0.05 Max	0.05 Max	0.05 Max
Meter Reading	200 mm soutes	20 mir spikes	200 mur poises
Output Voltage Limits (Volta DC) Floating Mater Reading	5.1 - 5.3 4.85	5.1 - 5.3 4.8 H	5.1 - 5.3 4.86
Output Noise Level (Velts AC)	0.05 Max	0.05 Max	0.05 Max
Meter Reading			
Output Voltage Limita (Volta DC)	7.75 - 8.25	7.75 - 8.25	7.75 - 8.25
Meter Reading	8.488	8.498	8.515
Output Noise Level (Volts AC) Meter Reading	0.05 Max 0.02 + 175 mm Agrica	0.05 Hax 0.02+ 175 my pocker	0.05 Hax 0.02+ 175mm sacker
Output Voltage Limits (Volta DC) Temps Meter Rending	8.6 - 9.0 8.62	8.6 - 9.0	8.6 - 9.0 8.65
Output Noise Level (Volts AC)	0.05 Max	0.Q5 Max	0.05 Max
Motor Reading	200 mm	200 mm	200 mu-
		I	L

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5.2 I.S. P.T. (Centinued)

Reference Paragraph 5.2.3

Crystal Rectifier Test

Input Voltage	Ostput Voltage Limits (Volta DC)	Meter Reading	Output Noise Level (Volts AC)	Meter Reading
Section A (Volts DC)				
+20.0	±150 mv	+40mm	0.04 Max	0.12° Soukes
+25.0	1.5-1.8	1.56	0.04 Max	Soukes 0.12"
+30.0		_	0.04 Mex	
30.25 +35.0	3.3 - 3.5 4 185 - 5115	3,18	, 0.04 Max	0.12°
Section B (Volts AC)				
105.0	<u>+</u> 250 av	+80mm	70.04 Max	0.03 *
110.0	1-1.5	1.20	0.04 Max	1
115.0	2.25-2.75	2.50	0.04 Max	
120.0	3.5-4.0	3. 70	0.04 Max	
125.0	4.75 - 5.25	5.00	0.04 Max	0.03

& Also 100 mor P-P of 800 0/6 moise present from commutator power supply.

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5.2 I.S.F.T. (Continued)

Reference Paragraph 5.2.3

Crystal Rectifier Test

Input Voltage Limits (Volta DC)	Output Voltage Limits (Volta DC	Meter) Reading	Cutput Noise Lovel (Volts AC)	Meter Reading
Section C (Volts AC)				
105.0	±250 mv	0 mv	0.04 Max	a.o3 *
110.0	1-1.5	1.20	0.04 Max	1
115.0	2.25- 2.75	2.50	0.04 Max	
120.0	3.5-4.0	3.70	.0.04 Max	
125.0	4.75 - 5.25	5.00	0.04 Max	3.03
Section D (Volts AC)				
105.0	+250 mv	+80 m~	0.04 Max	O.03 *
110.0	1-1.5	1.20	0.04 Max	1
115.0	2.25-2.75	2.50	0.04 Max	
120.0	3.5 - 4.0	3.70	0.04 Max	
. 125.0	4.75 - 5.25	5.00	0.04 Max	0.03

* Alex 100 mor P-P of 800 ~ noice great for the commutator

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(Continued) I.S.P.T.

Reference Paragraph 5.2.4

Rate Demodulator Test

Input Voltage (Volta AC)	Output Voltage Limits (Volts DC)	Meter Reading	Output Noise Level (Volts AC)	Heter Reading
Out of Phase				
0.125	<u>+</u> 40 mv	-300mm	0.05 Max	50mm *
0.100	0.4 - 0.6	+200mm	0.05 Max	4
0.075	0.9 -1.10	+720mmV	0.05 Max	
0.050	1.4-1.6	1.22	0.05 Max	
0.025	1.9 - 2.1	1.72 V	0.05 Max	
0	2.4-2.6	2.25 ✓	0.05 Max	
In Phase				
0	2.4-2.6	2.25 V	0.05 Max	
0.025	27-3.1	2.72 /	0.05 Max	
0.050	3.4-3.6	3.22 m	0.05 Max	
0.075	37-41	375 4	0.05 Max	
, 0.100	4.4-4.6	4.25 00/	0.05 Max	
0.125	4.90-5.10	4.75	0.05 Max	50 mm *

* Also 100 mir of 800 c/s noise from commutator

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5.2 I.S.P.T. (Continued)

Reference Paragraph 5.2.5

Differential Amplifier Test

	Amplifier No 1 Section A	Amplifier No 1 Section B	Amplifier No 2
Gain Limits Gain	49 - 51	49 - 51	49 - 51
	50	50	50
Output Noise	0.05 Max	0.05 Max	0.05 Max
Level (Volts AC)	0.02 *	0.02 米	0.02 *

* Also 100 mer sychis from commutator gover supply.

D-	Cerence	Da	-1-	4 2	4
AS.	LETERUS	77.77	ומסו	7.4	-₽

Temperature Bridge Test

Satisfactory check					
Unsatisfactory explain					
Note: Some segments projecy.					

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5.2 I.S.P.T. (Continued)

Reference Paragraph 5.2.7 Circuit Board Assy. Test

Limiter Section

Section	A	В	С	D	F	J	K
Input Voltage (Volts DC)	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Output Voltage (Volta DC)	-/.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8
Input Voltage (Volts DC)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Output Voltage (Volts DC)	-1.0	-1.0	-1.0	-1.0	-/.0	-1.0	-1.0
Input Voltage (Volts DC)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Output Voltage (Volts DC).	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0
Input Voltage (Volta DC)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Output Voltage (Vblts DC)	3.0	3.0	3 .0	3.0	3.0	3.0	3.0
Input Voltage (Volts DC)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Output Voltage (Volts DC)	5.0	510	5.0	5.0	5.0	5.0	5.0
Input Voltage (Volts DC)	7.0	7.0	7.0	₹.0	7.0	7.0	7.0
Output Voltage (Volts DC)	5.7	5.7	5.7	5.7	<i>5</i> : 7	5.7	5. ウ

REPORT 558636 -1 CONVAIR ASTRONAUTICS PAGE 12 11 July 1961 5.2 I.S.P.T. (Continued) Reference Faragraph 5.2.7 Circuit Board Assy. Test Blip Section Satisfactory check Unsatisfactory explain ____ Divider section output Voltage Limits -1.0 volts DC-Minimum Meter reading -1 VDC, also 80 mm of mouse

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(Continued)

Reference Paragraph 5.2.8 Function Tone Generator Test

Channel.	1	. 2	3	4	5
Input Voltage (Volta DC)	27.5	27.5	27•5	27.5	27.5
Output Frequency Limits (sps)	28 - 38	69 - 79	110 - 120	151 - 161	192 - 202
Meter Reading	33	76	1/8	158	200
Output Voltage Limits (RMS) (Peak to Peak)	0.071 to 0.087	0.071 to 0.087	0.115 to 0.141	0.154 to 0.188	0.198 to 0.242
Meter Resding	G.091	0.084	6./3/	a.175	0.220
Interference caused by other channels	a Re	PPHRENT at Freque Function	weres on	interfee the outpu- ue 24 to R.	ence ŧ af

Note: 150mm P-P of 800 4's Noise Present from Comm. P.S.

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5.2 I.S.P.T. (Continued)

Reference Paragraph 5.2.8 Function Tone Generator Test

Channal	6	7	8	9	10
Input Voltage (Volta DC)	27.50	27.50	27.50	27.50	27.50
Output Frequency Limits (ops)	233 - 243	274 - 284	315 - 325	356 - 366	397 - 407
Meter Reading	245	280	322.	364	403
Output Voltage Limits (Volta 1998 Peak to Peak)	0.245 to 0.299	0.289 to 0.353	0.322 to 0.392	0.369 to 0.451	0.407 60 0.497
Meter Rending	0.268	3.31 <u>5</u>	9.358	0.412	0,4,43
Interference caused by other channels	AGICA	PRABLEMS INCLION TO	on the	utput of	R

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5.2 I.S.P.T. (Continued)

Reference Paragraph 5.2.9 Commutator Power Supply Test

Input Voltage - +27.5 Volta DC Output Voltage Limits - 98 - 126.5 Volts AC Heter Reading //2 V Rms Comm. ON

Reference Paragraph 5.2.10 Power Changeover and Commutator Command Relay Test

Power Changeover Relay

Satisfactory check Unsatisfactory explain _____

Commutator Command Relay

Satisfactory Check

Unsatisfactory explain

(Continued)

Reference Paragraph 5.2.11

Filter Limiter Test

Channel.	. 1	4
Input Voltage	115 Volts AC	as in Figure 1
Output Voltage Limits **Country AC P-P	3.7-6.2 ,7-/.3	- 3.7 6.2 7-1.3
Output Voltage Volts AC P-P	1.0	0.7-10-0.8
Output Frequency (sps)	308 - 1032 370 - 430	4995 - 5805 888 - /032
Output Frequency	400	988 -960-1032

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I. S. P. T. Additional Mercury Modules

Calibrator

Calibrator Off
Output Voltage - 2.5 Volts D. C. (Nominal)
O-K.

Calibrator On
Output - 0-5 Volts D. C. square wave for 15-35 seconds,
frequency approximately 1 cps.
Oscilloscope Reading

Sub-Cerrier Oscillators

Output Frequency Linearity	6,798	17072	0.K	7,622	7.897
	1				
~					
Ch A Input Voltage	-,6	+.15	1+.9	+1.65	+24
Ch A Input Voltage Output Frequency Linearity	6 / 2 670	+.15 20380			+24 25.300

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5.4, 5.5, 5.6 Operational Tests
X. Axia acceleration

Date 3/22/6/
Test Eng. R.H. TPosses Witness A) Abultus.
USAF Witness
Start Time 1045
End Time 11/8

Module	Satisfactory Check	Unsatisfactory Fxplain
Transducer Power Supply	/	,
Crystal Rectifier	✓	
Rate Demodulator Lim. Filter	✓	·
Differential Amplifiers	/	
Temperature Bridges	/	

P.H. Torsester

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5.4, 5.5, 5.6 Operational Tests (Continued)

Module	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	√	·
Function Tone Generator	✓	
Commutator Power Supply	✓	
Power Changeover Relay	✓	
Commutator Command Buldy	. 🗸	

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5.4, 5.5, 5.6 Operational Tests (Continued)

MODULE	SA MISHAUTORY Chenk	UNTATISFACTORY EXPLAIN
CALIBRATOR	Not Checkeo	·
SUBCARRIER OSCIBLATORS Ch II and Ch A	Not Checked	

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5.3 Proof Cycle Test

After X, Axis Acceleention

Date 3/22/6/
Test Eng. R. N. Rocster
Witness 20/4/4/5/
USAF Witness Start Time ///8
End Time ///60

Module	Setisfactory Check	Unsatisfactory Explain
Treneducer Power Supply	/	
Crystal Rectifier	~	·
Pate Demodulator Lim. Filter	√	-
Differential Amplifiers	✓	Note: Leading edges of Commutations Segments are Rounded off
Temperature Bridges	✓	•

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5.3 Proof Cycle Test (Continued)

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	✓	
Power Changeover Relay	/	
Commutator Command Relay		
Circuit Board Assembly	/	

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5.3 Froof Cycle Test (Continued)

MCDULE	SATISPACTORY CHECK	UN ATISPACTORY EXPLAIN
CALIBEATOR .	✓	
SUBCAUTIER OSCILLATORS Ch II and Ch A	/	

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5.4, 5.5, 5.6 Operational Tests

X2 Axis Acceleration

Test Eng. RHTRocster
Witness DALLES
USAF Witness
Start Time 1160

Module	Satisfactory Check	Unsatisfactory Fxplain
Transducer Power Supply	/	
Crystal Rectifier	/	
Rate Demodulator	√	
Differential Amplifiers	✓	
Temperature Bridges	V	

R. H. Torester

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5.4, 5.5, 5.6 Operational Tests (Continued)

Module	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	√	
Function Tone Generator	✓	
Commutator Power Supply	/	·
Power Changeover Relay	,	,
Commutator Command Balay	✓	

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5.4, 5.5, 5.6 Operational Tests (Continued)

MODULE	BATTITEZ TORY CHECK	UNEATISFACTORY EXPLAIN
CALIBRATCE	Not Checked	
SURCARRIER OSCILLATORS Ch II und Ch A	Not Checked	

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5.3 Proof Cycle Test

After X2 RXIS Acceleration Test Eng. 2H. Tenester

Witness Differential

USAF Witness

Start Time | 1/63 |
End Time | 1/90

Satisfactory Check	Unsatisfac s ory Explain
/	

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5.3 Proof Cycle Test (Continued)

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	
Commutator Power Supply	1	
Power Changeover	/	
Commutator Command Relay	/	
Circuit Board Assembly		

Same Same King Best Land

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5.3 Proof Cyale Test (Continued)

MODULE	SATISPACTORY CHECK	unsatisfactory explain
CALINPATOR	/	
SUBCARRIER OSCILLATORS Ch II and Ch A	/	

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5.4, 5.5, 5.6 Operational Tests

V Axis Acceleration

Date 3/22/6/
Test Eng. R. N. Teocster
Witness Whatting
USAF Witness
Start Time 1/9/
End Time 1/9/6

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	/	
Crystal Rectifier	/	
Rate Demodulator Lim. Fire	/	
Differential Amplifiers	/	
Temperature Bridges	/	·

R. H. Trouter

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5.4, 5.5, 5.6 Eperational Tests (Continued)

Modul •	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	/	
Function Tone Generator	/	
Commutator Power Supply	✓	
Power Changeover Relay	/	
Commutator Command Ruley	v	

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MODULE .	SATISM FORY CHECK	UNBATIGFACTORY EXPLAIN
CALIBRATOR	Not Checkeb	
SUBCARRIER OSCILLATORS Ch II and Ch A	Not Checked	

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5.3 Proof Cycle Test

After Y MXIS Acceleration

USAF Witness

Start Time //96

End Time /2/2

Module	Satisfactory Check	Unsatisfac s ory Explain
Transducer Power Supply	/	
Crystal Rectifier	/	
Rate Demodulator Lim Filt	/	
Differential Amplifiers	✓ .	
Temperature Bridges	✓	
		R.M. Troust

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Proof Cycle Test (Continued)

Satisfactory Unsatisfactory Module check Explain Function Tone Generator Commutator Power Supply Power Changeover Relay Commutator Command Relay Circuit Board Assembly

Car Frank

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MODULE	SATICFACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBRATOR	/	
SUBCARRIER OSCILLATORS Ch II and Ch A	/	

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5.4, 5.5, 5.6	Operational Tests Acceleration	Date 3/22/61	
Y2 Mx12	HECELERACION	Witness Whatty	
		USAF Witness Start Time /2/2 Prod Time /2/6	

Modul•	Satisfactory Check	Unsatisfactory Fxplain
Transducer Power Supply		
Crystal Rectifier	✓	
Rate Demudulator Lim Fixt	~	
Differential Amplifiere		
Temperature Bridges	~	•

R. N. Trocata

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Module	Satisfactory Check	Unsatisfactory Explain	
Circuit Board Assembly			
Function Tone Generator	/		
Commutator Power Supply	./		
Power Changeover Relay	/		
Commutator Command Roley			

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•		
MODULE	SATISMA TORY CHMCK	UNTATIGFACTORY EXPLAIN
CALIBRATOR.	Not Checked	
SUBCARRIER OSCI-LATORS Ch II and Ch A	:Not Checkeo	

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5.3	Proof	Cycle Test	, .	Date _ 3/22/	61
A	Fter	Y2 Axis	Acceleration	Witness Witness	H. Terester
				Start Time	1216

/	
/	
~	`\

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	
Commutator Power Supply	/	
Power Changeover Relay	/	
Commutator Command Relay	/	
Circuit Board Assembly	/	

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MODULE	SATISFACIONY ·	unpatisfactory explain
CALIBEATOR	/	
SUBCARRIER OSCILLATORS Ch II and Ch A	V	

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5.4, 5.5, 5.6 Operational Tests

Z Axis Acceleration

Date \(\frac{\frac}{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\fr

Modul⊕	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	~	
Crystal Rectifier	/	
Rate Demodulator		
Differential Amplifiers	/	
Temperature Bridges	/	

R. N. Torrester

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Module	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	/ -	
Function Tone Generator	/	
Commutator Power Supply	, .	
Power Changeover Relay	V	
Commutator Command Smilty,	~	

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WODULE	SALITHE TORY CHECK	UNTATISFACTORY EXPLAIN
CALIBRATOR	Not Checked	,
SUBCARRIER OSCICLATORS Ch II and Ch A	Checker Not	

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5.3 Proof Cycle Test
After Z, Axis Acceleration

Usar Vitness
Start Time 1243
End Time 1252

Modul.e	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	~	
Crystal Rectifier	/	
Rate Demodulator Lym Firt	/	
Differential Amplifiers	/	
Temperature Bridges	/	

R. N. Trouste

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	
Commutator Power Supply	/	·
Power Changeover Relay	/	·
Commutator Command Relay	/	
Circuit Board Assembly	V	

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5.3 Froof Cycle Test (Continued)

MCDULE	SATISPACIONY CHECK	UNSATISFACTORY EXPLAIN
CALIBEATOR	✓	
SUBCAURIER OSCILLATORS Ch II and Ch A		

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5.4, 5.5, 5.6 Operational Tests

Z₂ Axis Acceleration

Date 3/22/6/
Test Eng. R H Treester
Witness 10/401/4/
USAF Witness
Start Time 1252
End Time 1256

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	✓	
Crystal Rectifier	~	·
Rate Demodulator Lim Fit	~	
Differential Amplifiers	_	
Temperature Bridges	~	

R. H. Trocater

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Module	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	√	
Function Tone Generator	√ .	
Commutator Power Supply	7	
Power Changeover Relay	/	
Commutator Command Relay	/	

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Module	SATISPROTORY CHECK	ungatisfactory explain
CALIBRATOR	Not Checked	
SUPCARRIER OSCILLATORS Ch II and Ch A	Not Checkes	

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5.3 Proof Cycle Test

Date 3/22/6/

Test Eng. R.H. Tenester

Witness Distriction

USAF Witness

Start Time 1256

End Time 137/

Module	Satisfactory Check	Unsatisfac s ory Explain
Transducer Power Supply	√	
Crystal Rectifier	V	
Bate Demodulator Lim Fift	1	
Differential Amplifiers	/	
Temperature Bridges	✓	

P. H. Torrecter

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Proof Cycle Test (Continued)

Modul⊕	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	/	
Power Changeover	√	
Commutator Command Relay	✓	
Circuit Board Assembly		

P 4. 20142. 1.

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MODULE	SATISFACTORY CHECK	undatisfactory explain
CALIBEATOR	~	
SUBCARRIER OSCILLATORS Ch II and Ch A	Ch II: 6800 7360 7415 Ch A: 18,782 22,141 25,407	

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5.4, 5.5, 5.6 Operational Tests

High Actituse

Date 3/23/6/
Test Fing. E # Tenestee
Witness Whatley.
USAF Witness
Start Time /400
End Time /690

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	/	
Crystal Rectifier	/	·
Rate Demudulator Lim Filt		
Differential Amplifiers	/	
Temperature Bridges	į.	

R. H. Trouter

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Module	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	/	
Function Tone Generator	,	
Commutator Power Supply	/	
Power Changeover Relay	/	
Commutator Command Rakty	/	

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MODULE	SATISPICTORY CHECK	Ungatigfactory explain
CALIBRATOR	✓	
SUBCARRIER OSCICLATORS Ch II and Ch A	/	

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5.3 Proof Cycle Test
After High Altitude

Test Eng. RH Tecester
Witness Marting
USAF Witness
Start Time 1640
End Time 1680

Module	Satisfactory Check	Unsatisfad é ory Explain
Transducer Power Supply	· /	
Crystal Rectifier	/	
Rate Demodulator Lim Filt	✓	
Differential Amplifiers	1	
Temperature Bridges		•
		P. H. Torester

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	J.	·
Commutator Power Supply	/	•
Power Changeover Relay	/	
Commutator Command Relay		·
Circuit Board Assembly	y	

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MODULE	SATISFACIORY CHECK	unsatisfactory explain
CALIBEATOR	/	
SUBCARRIER OSCILLATORS Ch II and Ch A	✓	

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7.3 Proof Cycle Test

After Section 5.5 a

RADIANT HEAT

Test Eng. R H (Rocster Witness Start Time 169/ End Time 1796

Module	Satisfactory Check	Unsatisfac s ory Explain
Transducer Power Supply	/	·
Crystal Rectifier	/	
Ante Demodulator	/	
Differential Amplifiers		No output on Amplifier of Ch 8. Amplifier Was Replaced.
Temperature Bridges	/	

R. N. Trouster

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	√ !	
Commutator Power Supply	✓	
Power Changeover	,	
Commutator Command Relay	/	
Circuit Board Assembly	, sur	·

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MCDULE	SATISFACTORY CHECK	uncatisfactory explain
CALIBEATOR	1	
SUBCARRIER OSCILLATORS Ch II and Ch A	/	

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5.3 Proof Cycle Test After Section 5.5 6 (-30°F + 3.44 " + H3)

> Temp. At O'F During this PROOF CYCLE.

Start Time _ End Time _

Module	Satisfactory Check	Unsatisfac s ory Explain
Transducer Power Supply	/	
Crystal Rectifier		Output Voltages MAY Be Streeting to DRIAL. A.C. Section outputs ARE.5 to .6 Volts too high At this temperature
Rate Demodulator Jum Fuder	/	
Differential Amplifiers		
Temperature Bridges		

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5.3 Proof Cycle Test (Continued)

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		The Output frequencies of Ch 2.16.7 through 2.16.10 ARE ALL ABout 20 4's too high At this temperature.
Commutator Power Supply	✓	
Power Changeover Relay	, .	
Commutator Command Relay		
Circuit Board Assembly	✓.	

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MODULE	SATTOPNOTORY CRECK	UN-ATIGENCTORY EXPLAIN
CALIBIANOR	✓	
SUBCARRIER OSCILLATORD Ch II and Ch A	V	

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5.3 Proof Cycle Test

After PARA 5.5 c

TEMP- Huminity ENV.

110°F +9570 Res. Himibity During Proof Cycle

Start Time

Modul.e	Satisfactory 'Check	Unsatisfaé s ory Explain
Transducer Power Supply		5.00 CALIB. SIGNAL IS .Il Volts too high
Crystal Rectifier		AC section outputs ARE ABout .6 VAC too high for the RANGE of INPUTS.
Rate Demodulator .+ Lim Filter	/	
Differential Amplifiers		CAIN Ch7 - 47 Ch8 - 46 ch9 - 50 - ak
Temperature Bridges		MANY Segments ARE Noisy. Some Resistance VALUES MAY have changed.

. R. N. Trouster

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A. A. A.

5.3 Proof Cycle Test (Continued)

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	
Commutator Power Supply	/	
Power Changeover Relay	√	
Commutator Command Relay	/	
Circuit Board Assembly	✓	

1 3 1 3 1

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MODULE	SATISFACTORY CHECK	un: atisfactory explain
CALIBRATOR		The CALIBRATOR FRILED to OPERTE.
SUBCARRIER OSCILLATORS Ch II and Ch A	1	

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5.3 Proof Cycle Test Relative Humidity for 4 hours

Start Time End Time _

Module	Satisfactory Chack	Unsatisfactory Explain
Trensducer Power Supply		Several Butputs out of 8 Pec. 1-1.161 +2.56 +5.10
Crystel Rectifier		DC. Section OK. R.C. Section Outputs .46 Volts too high.
Rate Demodulator Lim Filter	/	
Differential Amplifiers		Gain Ch 7 - 47 " Ch 8 - 48 " Ch 9 + 50
Temperature Bridges		Noisy Segments Present Resistance Values Mayaure Changeo.
		R. H. Toroster

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5.3 Proof Cycle Test (Continued)

Satisfactory Unsatisfactory Module check Explain Function Tone Generator Commutator Power Supply Power Changeover Relay Commutator Command Relay Circuit Board Assembly

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5.3 Proof Cycle Test (Continued) .

WODULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBRATOR	√. ₩	
SUBCARRIER OSCILLATORS Ch II and Ch A	V	•

* Note: CALIBRATOR DIDNY WORK AT END OF LAST PROOF CYCLE.

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5.3 Proof Cycle Test

Acter Section 5.5 a

Temp. Shick Test

Date 3/29/6/
Test Eng. RH Tracefer
Witness 1/1/6/19/19/19
USAF Witness 2/30
End Time 2/200

Satisfactory Check	Unsatisfað t ory Explain
	Several Outputs out of SPEC: -1.19 "CAL +2.56" CAL . +5.12" CAL
? '	A.C. Section Outputs High
· ·	
	Ch7 - GAIN 47 Ch8 - GAIN 48
	Some Noist Segments Some Resistances Marhare ahanges.
	Check

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	
Commutator Power Supply	/	
Power Changeover Relay	/	·
Commutator Command Relay	/	
Circuit Board Assembly	/	

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MODULE	SATISPACIERY CHECK	UNSATISFACTORY EXPLAIN
CALIBEATOR	1	
SUBCARRIER OSCILLATORS Ch II and Ch A	/	

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5.3 Proof Cycle Test

PRIOR to VIBRATION

Date 3/30/6/
Test Eng. 2 / TROSSEC R
Witness TWHOSTER
USAF Witness
Start Time 2382
End Time 2600

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	/	
Crystal Rectifier -		AC Voltage outputs are ABout .6 V Dc too ligh
Pate Demodulator + Lim Fit	/	
Differential Amplifiers		GRING OFF AS IN LAST PROOF
Temperature Bridges		Some Segments Noist

R.H. Toresto

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	
Commutator Power Supply	/	
Power Changeover	Ý	·
Commutator Command Relay	/	
Circuit Board Assembly		

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MODULE	SATISFACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBEATOR	/	
SUBCARRIER OSCILLATORS Ch II and Ch A	J .	

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5.4, 5.5, 5.6 Operational Tests Z Axis VIBRATION

Test Eng. Start Time End Time

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply		
Crystal Rectifier	/	·
Pate Demodulator Lina Firt	V	·
Differential Amplifiers		·
Temperature Bridges		

R. H. Trocater

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5.4, 5.5, 5.6 Operational Tests (Continued)

Module	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	✓.	·
Function Tone Generator	/	
Commutator Power Supply	Y	
Power Changeover Relay	/	
Commutator Command Baldy	✓	

CONVAIR	1

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5.4, 5.5, 5.6 Operational Tests (Continued)

MODULE	GATISHI (TORY CHENK	UNGATIBRACTORY EXPLAIN
CALIBRATOR	/	-
SUBCARRIER OSCICLATURS Ch II and Ch A		,

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5.3 Proof Cycle Test

AFter Z Axis Vibration

Date 3/31/61
Test Eng. R.H. Goester
Witness / Waster
USAF Witness
Start Time 2720
End Time 2750

Modul•	Satisfactorý Check	Unsatisfactory Explain
Transducer Power Supply	✓	
Crystal Rectifier		Outputs of A.C. Section . 6 voc high.
Rate Demodulator + Lim Fixter	V	
Differential Amplifiers		Ch7+8 GAINS LOW
Temperature Bridges	V	

R. H. Torester

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5.3 Proof Cycle Test (Continued)

Market 1

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	✓.	-
Commutator Power Supply	/	
Power Changeover	· 🗸	
Commutator Command Relay	✓	•
Circuit Board Assembly	/	

Jak Jugarie

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MCDULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBFATOR	/	•
SUBCARRIER OSCILLATORS Ch II and Ch A	V	

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5.4, 5.5, 5.6 Operational Tests

V Axi3

Date 3/3/6/
Test Eng. RH. TROESTER
Witness TWANTS
USAF Witness
Start Time 2767

End Time

Satisfactory Unsatisfactory Module Check Explain Transducer Power Supply Crystal Rectifier Demos. Output Applitude VARIED At LOW VIBRATION FREQUENCIES Rate (60-90 e/s) Demudulator Lin Fit Ch & APIPLIFIER Lost output for Atime . . Differential Output LATER CAME BACK Amplifiers SAtisFACtoRILY Temperature Bridges

R.H. Trocater

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5.4, 5.5, 5.6 Cperational Tests (Continued)

Modul⊕	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	./	,
Function Tone Generator		
Commutator Power Supply	/	
Power Changeover Relay	/	
Commutator Command Robby	/	
-		Land Contraction

CO	NV	AI	R

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5.4, 5.5, 5.6 Operational Tests (Continued)

MODULE	GATISEA TORY CHECK	UNBATIBFACTORY EXPLAIN
CALIBRATOR	/	
SUPCARRIER OSCILLATORS Ch II and Ch A	/	

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5.3 Proof Cycle Test

After Y Axis Vibration

Date 3/31/6/
Test Eng. RH TROESTER
Witness All Latting
USAF Witness
Start Time 2870
End Time 2910

R. N. Trouter

Module	Satisfactory Check	Unsatisfac h ory Explain
Transducer Power Supply	· /	
Crystal Rectifier		Jutputs high
Rate Demodulator Lies First		Umbrigade Noich
Differential Amplifiers	·	CH748 GRINS LOW
Temperature Bridges		Some Seaments Not At PROPER VALUE

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	
Commutator Power Supply	/	
Power Changeover Relay	/ /	
Commutator Command Relay	V	
Circuit Board Assembly	√	į

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MCDULE	SATISFACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBEATOR	/	
SUBCARRIER OSCILLATORS On II and Ch A	• 1	

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5.4, 5.5, 5.6 Operational Tests X Axis VIBRATION Test Eng. Witness / USAF Witness Start Time

End Time

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	/	
Crystal Rectifier	· ·	•
Rate Demodulator		Demod Output Neist At Low Freq. (60-70%) of VIBRACION
Differential Amplifiers		·
Temperature Bridges	/	

R. H. Trocater

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5.4, 5.5, 5.6 Cperational Tests (Continued)

Module	Satisfactory Check	Unsatisfactory Explain
Circuit Board Assembly	/	,
Function Tone Generator	Ż	
Commutator Power Supply	/	
Power Changeover Relay	✓	
Commutator Command Ralay	/	

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5.4, 5.5, 5.6 Operational Tests (Continued)

MODULE	SATISENCTORY CHECK	UNGATISFACTORY EXPLAIN
CALIBRATOR	1	
SUBCARRITH OSCICIATORS Ch II and Ch A	/	

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5.3 Proof Cycle Test

After X Axis Visentian

Date 3/3//6/
Test Eng. R. H. TRocater
Witness Witness
USAF Witness
Start Time 2130
End Time 294/

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	/	
Crystal Rectifier		
Rate Demodulator + Lim Futer	/	Output of Demob OK
Differential Amplifiers		GRIN OF Ch7+Ch3 Low
Temperature Bridges		Some segments Nover

R. N. Torrester

11 July 1961

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	✓	
Commutator Power Supply	/	
Power Changeover Relay	/	
Commutator Command Relay	~	
Circuit Board Assembly	/	

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MCDULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBRATOR	/	
SUBCARRIER OSCILLATORS, Ch II and Ch A	V	

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5.3 Proof Cycle Test

Prior to Stret of
Life Testins

Date 4/6/6/
Test Eng. PH Trocster
Witness Alkerthy
USAF Witness
Start Time 2946
End Time 3068

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	✓	
Crystal Rectifier		\$C output high for ALL INPUTS \$A 125" IN gives 5.4 UBC out, Should Be 510 V.
Rate Demodulator + Lim Filter	. 🗸	
Differential Amplifiers		GAIN CL7 47 CL8 48 CL9 50
Temperature Bridges	/	
		R. N. Troloter _

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	/	-
Commutator Power Supply	/	
Power Changeover	/ .	
Commutator Command Relay	<i>,</i>	
Circuit Board Assembly	/	

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MODULE	SATISFACTORY CHECK	Unsatisfactory Explain
CALIBRATOR		
SUBCARRIER OSCILLATORS Ch II and Ch A	/	

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5.3 Proof Cycle Test
Life Test

Date 4/7/6/
Test Eng. RH. Tracster
Witness (A) Kaully
USAF Witness
Start Time 3973
End Time 3993

Module	Satisfactory .Check	Unsatisfactory Explain
Transducer Power Supply	/	
Crystal Rectifier	/	
Rate Demodulator Lim. Filter	√	
Differential Amplifiers		Ch 718 GAINS LOW
Temperature Bridges	/	- ···
		P. N. Torosto

MME 100

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	✓ .	
Power Changeover	J	
Commutator Command Relay	/	
Circuit Board Assembly	, `	

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MODULE.	SATISPACTORY CHECK	Unsatisfactory explain
CALIBIATOR	✓	
SUBCARRIER OSCILLATORS Ch II and Ch A	. 1	·

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5.3 Proof Cycle Test
LIFE TesT

Date April 7 /7//
Test Eng. Trensfor
Witness O Harter
USAF Witness
Start Time 9:00 AM
End Time

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply		
Crystal Rectifier	~	
Pate Demodulator Lim Fiz		
Differential Amplifiers		CH748 Low Gain on Amplifier
Temperature Bridges	V .	`
		P. H. Tweeter

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11 July 1961

Modul⊕	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	V	·
Power Changeover Relay		
Commutator Command Relay	V	•
Circuit Board Assembly	V	• ·

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11 July 1961

5.3 Proof Cycle Test (Continued)

9 7+11

MODULE	SATIBFACTORY CHECK	UNCATISFACTORY EXPLAIN
CALIBEATOR		
SUBCALRIER OSCILLATORS Oh II and Ch A		

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11 July 1961

5.3 Proof Cycle Test
Life TesT

Test Eng. Trocs/cr
Witness CONSTITUTE
USAF Witness
Start Time 9100 AM
End Time 10:00 AM

Module ,	Satisfactory Check	Unsatisfac h ory Explain
Transducer Power Supply	V	
Crystel Rectifier	V	
Rate Demodulator Lim Fil	/	-
Differential Amplifiers		CH 748 LOW Gain
Temperature Bridges		,
		P. H. Tweeter

11 July 1961

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	V	
Commutator Power Supply	V	
Power Changeover Relay	V	
Commutator Command Relay	V	
Circuit Board Assembly	V .	·

CONVAIR	N.	ASTRONAUTICS
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MODULE	SATISFACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBRATOR		
SUBCALRIER OSCILLATORS Ch II and Ch A		

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PASE 108

11 July 1961

5.3 Proof Cycle Test
Life Test

Test Eng. Troes fer Witness (Abuttus)
USAF Witness
Start Time #:/3
End Time

R. H. Trout

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply		·
Crystal Rectifier	V	
Rate Demodulator L. F.	~	
Differential Amplifiers		Low on CH 778
Temperature Bridges	ν.	

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Gamerator		
Commutator Power Supply	V	·
Power Changeover Relay		
Commutator Command Relay		
Circuit Board Assembly		-

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11 July 1961

Module	SATISFACIONY CHECK	unsatisfactory explain
CALIBRATOR		
SUBCARRIER OSCILLATORS Ch II and Ch A	V	

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PASE 111

11 July 1961

5.3 Proof Cycle Test

Date 7 206 Test Eng. Trocs fer Witness 6 20 Months. USAF Witness Start Time 7:75

R.H. Treeste

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	V	
Crystal Rectifier	V	
Rate Demodulator L. F.	V	
Differential Amplifiers		CH7 +8 Low
Temperature Bridges	r	,

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11 July 1961

5.3 Proof Cycle Test (Continued)

Life Pest

Modul⊕	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	: ~	
Power Changeover Relay	· •	
Commutator Command Relay	L	
Circuit Board Assembly	ب	-

PARE 113

11 July 1961

5.3 Proof Cycle Test (Continued)

MODULF:	SATISFACTORY CHECK	Uncatisfactory explain
CALIBEATOR	: V	
SUBCALLITER OSCILLATORS Ch II and Ch A	L	

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11 July 1961

5.3 Proof Cycle Test
Life Cycle

Date 2/6
Test Eng. Troesfer
Witness Witness
USAF Witness
Start Time 7:15
End Time 10:12

· Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply		
Crystal Rectifier	V	
Rate Demodulator L. F.	V	
Differential Amplifiers	Note: >	CH 7 + 8 Low
Temperature Bridges	V	
		R. H. Torester

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5.3 Proof Cycle Test (Continued)

Like Cycle

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	r	
Commutator Power Supply	V	
Power Changeover Relay	r	
Commutator Command Relay	r	
Circuit Board Assembly	r	•

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5.3 Froof Cycle Test (Continued)
Like Cycle

MODULE	SATISFACTORY CHECK	UNFATISFACTORY EXPLAIN
CALIBEATOR		
SUBCARRIER OSCILLATORS Ch II and Ch A	~	

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11 July 1961

5.3 Proof Cycle Test
Life 7est

Date Test Eng. Tracker
Witness Whatter
USAF Witness
Start Time 2:15

Modul.e	Satisfactory Check	Unsatisfac h ory Explain
Transducer Power Supply	<i></i>	·
Crystal Rectifier		
Rate Demodulator	· V	
Differential Amplifiers		CH 748 Low
Temperature Bridges		•
<u> </u>		R. N. Torester

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	W.	
Commutator Power Supply	V	
Power Changeover Relay	V.	
Commutator Command Relay		
Circuit Board Assembly	V	

PASE 13

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MODULE	SATISFACTORY CHECK	UNCATISFACTORY EXPLAIN
CALIBFA'TOR		
SUBCARRIER OSCILLATORS Ch II and Ch A	V	

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5.3 Proof Cycle Test

Date Sprik 35-6/Test Eng. Tracs/ex
Witness Wifest Title
USAF Witness
Start Time 8:15
End Time

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	. ~	
Crystal Rectifier	~	
Rate Demodulator L. F.	<i>\\</i>	
Differential Amplifiers		748 Low
Temperature Bridges	~	

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11 July 1961

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	, /	
Commutator Power Supply	/	
Power Changeover Relay		
Commutator Command Relay	∠	i fi same i
Circuit Board Assembly	.~	

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MCDULE	SATISFACTORY CHECK	un: atisfactory explain
CALIBEATOR	ï	
SUBCAERIER OSCILLATORS Ch II and Ch A	<i></i>	

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11 July 1961

5.3 Proof Cycle Test

Test Eng. Processer
Witness Witness
USAF Witness
Start Time

Module	Satisfactory Check	Unsatisfac b ory Explain
Transducer Power Supply	<i>L</i>	
Crystal Rectifier	V	
Rate Demodulator L. F.	V	
Differential Amplifiers		748 Low
Temperature Bridges	L-	
		RN. Trocates

٦ .

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Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	<i>-</i>	
Power Changeover		·
Commutator Command Relay	V	
Circuit Board Assembly	V	

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MCDULE	SATISFACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBRATOR	, -	·
SUBCARRIER OSCILLATORS Ch II and Ch A		

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5.3 Proof Cycle Test Life Test Date 4/20/6
Test Eng. Trock/ch
Witness Whatley
USAF Witness
Start Time 8/30
End Time

Module	Satisfactory Check	Unsatisfac š ory Explain
Transducer Power Supply	L-	
Crystel Rectifier	~	
Rate Demodulator 2. F. (3)	-	
Differential Amplifiere	4	748 Low
Temperature Bridges		•
,		R.N. Trouster

11 July 1961

Proof Cycle Test (Continued) Life Test

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	. •	
Power Changeover		
Commutator Command Relay	~	
Circuit Board Assembly	V.	

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MODULE	SATISFACTORY CHECK	ungatisfactory explain
CALIBRATOR		
SUBCALRIER OSCILLATORS Ch II and Ch A	~	

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5.3	Pro	of	Сус	10	Test
Li	Fo	0	Y 0	1	2

Date 4/27/6/7
Test Eng. 7/20/6/7
Witness 6/2/6/7
USAF Witness
Start Time 6/3
End Time

Satisfactory Check	Unsatisfactory Explain
V.	
V.	
	748 LOW
	Check

. . .

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5.3 Proof Cycle Test (Continued)

Life Cycle

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	· ~	
Commutator Power Supply '	V	
Power Changeover	V	
Commutator Command Relay	V	
Circuit Board Assembly	V	·

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5.3 Proof Cycle Test (Continued)

L, Fe Pest

MODULE	SATINFACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBEATOR	>	
SUBCARRIER OSCILLATORS Ch II and Ch A	V;	

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Proof Cycle Test
Life Cyche Pest

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply		
Crystal Rectifier		
Ente Demodulator L.F.	V	
Differential Amplifiers		748 Low
Temperature Bridges		

8,5

R. H. Tools

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5.3 Proof Cycle Test (Continued)

Like Test

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	V	
Commutator Power Supply		
Power Changeover	V	
Commutator Command Relay		
Circuit Board Assembly	V	

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5.3 Proof Cycle Test (Continued) Life Pest

MODULE	SATISFACTORY CHECK	ungatisfactory explain
Calibrator	-	
SUBCARRIER OSCILLATORS Ch II and Ch A	,	

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5.3 Proof Cycle Test
Like Cycle

Date May 8-6/
Test Eng. Trees/ex
Witness Office Sex
USAF Witness
Start Time 9:/5
End Time

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	i, V	
Crystal Rectifier	V	
Rate Demodulator L.F.	~	
Differential Amplifiers		748 Low
Temperature Bridges	•	

R. H. Torester

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5.3 Proof Cycle Test (Continued)

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		
Commutator Power Supply	V	
Power Changeover Relay	V	
Commutator Command Relay		
Circuit Board Assembly	V	

Contract Annual Experience

CO	N	٧	Α	I	R

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MODULE	SATISPACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBRATOR		
SUBCARRIER OSCILLATORS Ch II and Ch A		

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Met .136

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5.3 Proof Cycle Test
Life Tesf

Test Eng. Tracsfor
Witness Witness
USAF Witness
Start Time 8/13
End Time 0/45

Module	Satisfactory Check	Unsatisfac b ory Explain
Transducer Power Supply	V	
Crystel Rectifier	V	
Rate Demodulator L.F.	V	
Differential Amplifiers		748 1.W
Temperature Bridges	V	
		R. H. Trocate

NEPONT 55B636-1

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5.3 Proof Cycle Test (Continued)

Life Test

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	V.	
Commutator Power Supply	V	
Power Changeover Relay		
Commutator Command Relay	V	grande de la contraction de la
Circuit Board Assembly	V	

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5.3 Proof Cycle Test (Continued)

MODULE	SATISFACTORY CHRCK	Unsatisfactory explain
CALIBRATOR	3	
SUBCARRIER OSCILLATOR3 Ch II and Ch A	V	•

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5.3 Proof Cycle Test
Life Test

Date 5/4/6/
Test Eng. Trotsfer
Witness Witness
USAF Witness
Start Time 6/5
End Time 8/45

Module Satisfactory Check		Unsatisfac t ory Explain	
Transducer Power Supply			
Crystel Rectifier	V		
Rate Demodulator L.F.	\(\nu_{\cdots}\)		
Differential Amplifiers	··	748 LOW	
Temperature Bridges	~		

P. K. Toronto

ME 142 3

11 July 1961

5.3 Proof Cycle Test (Continued)

Life Test

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	, V	·
Commutator Power Supply	V	
Power Changeover Relay	r	
Commutator Command Relay	r	
Circuit Board Assembly	/	·

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5.3 Proof Cycle Test (Continued)

Module	SATISFACTORY CHECK	uncatisfactory explain
CALIBEATOR .	4 ,	
SUBCARRIER OSCILLATORS Ch II and Ch A	r.	

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5.3 Proof Cycle Test

Life Cycle

Date 5 Trees Fry
Witness Where
USAF Witness
Start Time 9:15
End Time 0:45

Module	Satisfactory Check	Unsatisfać š ory Explain
Transducer Power Supply	·	
Grystal Rectifier		
Rate Demodulator	~	
Differential Amplifiers		CA 748 Low
Temperature Bridges	~	
		R. H. Torester

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Proof Cycle Test (Continued)

Life Cycle

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	~	
Commutator Power Supply	V.	
Power Changeover	V	
Commutator Command Relay	L	A Company of the section
Circuit Board Assembly		· •

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5.3 Froof Cycle Test (Continued)

Life Cycle

í

MCDULE	SATISFACTORY CHECK	UNSATISFACTORY EXPLAIN
CALIBRATOR	-	
SUBCARRIER OSCILLATORS Ch II and Ch A	<i>L</i>	,

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5.3 Pro	of Cycle Test		Date 5/8/	61
		•	Test Eng. 7	roester
Lite	Cycle		Witness Clark	willest
		•	USAF Witness	
		Section 1	Start Time	11/1
			End Time	

Module	Satisfactory Check	Unsatisfac š ory Explain
Transducer Power Supply		
Crystal Rectifier	2	
Rate Demodulator	L	
Differential Amplifiers		7\$8 Low
Temperature Bridges	V	
		R.H. Trotates_

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5.3 Proof Cycle Test (Continued)

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	۲	·
Commutator Power Supply	· ir	
Power Changeover Relay	V	
Commutator Command Relay	V	
. Circuit Board Assembly	V	·

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5.3 Proof Cycle Test (Continued)

MODULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBRATOR	! •	
SUBCARRIER OSCILLATORS Ch II and Ch A		

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5.3 Proof Cycle Test

Life Cycle

Date 5/9/6/
Test Eng. Track
Witness Witness
USAF Witness
Start Time 11/30
End Time

Module .	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply	V	
Crystel Rectifier	V	
Rate Demodulator	V	
Differential Amplifiers		A748 Low
Temperature Bridges	V	
		R. V. Trocater

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5.3 Proof Cycle Test (Continued)

Life TesT

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	4	•
Commutator Power Supply	· L	
Power Changeover Relay	L	
Commutator Command Relay	V	
Circuit Board Assembly	L	

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5.3 Proof Cycle Test (Continued)

Life Tost

MODULE	SATISFACIONY CHECK	UNSATISFACTORY EXPLAIN
CALIBRATOR	~	
SUBCATRIER OSCILLATORS Ch II and Ch A	r	•

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5.3	Proof Cycle	Test	
	L.Fe	Cych	l e

Start Time

Module	Satisfactory Check	Unsatisfac è ory Explain
Transducer Power Supply		
Crystal Rectifier	レ	
Rate Demodulator L.F.	ν	
Differential Amplifiers		(#7+8 Low
Temperature Bridges	ν	· •
-		R. H. Trouter

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5.3 Proof Cycle Test (Continued)

Life Cycle

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	₽	
Commutator Power Supply	U	·
Power Changeover Relay	V.	
Commutator Command Relay	V	
Circuit Board Assembly		

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11 July 1961

5.3 Froof Cycle Test (Continued) Life Cycke

MODULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBRATOR	ب	
SUBCAMRIER OSCILLATORS Ch II and Ch A	V Est	

. . .

3 17.4

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5.3 Proof Cycle Test
Life Test

Date 5///6/
Test Eng. Treasfer
Witness MARINE ...
USAF Witness
Start Time 6//5
End Time 9/45

Module	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply		
Crystal Rectifier	V	CE STATE OF THE PARTY OF THE PA
Pate Demodulator L.F.	r	
Differential Amplifiers		CH 7+8 Low
Temperature Bridges	V	

R. H. Torse

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5.3 Proof Cycle Test (Continued)

Life Cycle

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	ν	·
Commutator Power Supply	V	
Power Changeover Relay	V	
Commutator Command Relay	V	
Circuit Board Assembly	V	

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5.3 Proof Cycle Test (Continued)

Life Cycle

MODULE	SATISFACIORY CHECK	ungatisfactopy explain
Calibrator	~	
SUBCARRIER OSCILLATORS Ch II and Ch A	V	

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5.3 Proof Cycle Test
Life Cycle

Date 5/2/6/
Test Eng. Trees/er
Witness Witness
USAF Witness
Start Time 8/13
End Time 9/12

Module	Satisfactory Check	Unsatisfad k ory Explain
Transducer Power Supply	r	
Crystal Rectifiar	W.	
Rate Demodulator		
Differential Amplifiers	(M2)	Cf 748 Low
Temperature Bridges	4	
		R. H. Torestes_

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Proof Cycle Test (Continued)

Life Test

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	L.	
Commutator Power Supply	; -	
Power Changeover Relay	8	
Commutator Command Relay	1 100 100 100	And the second
Circuit Board Assembly	L	

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5.3 Proof Cycle Test (Continued)

Life Test

MODULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBRATOR	V	
SUBCASSIER OSCILLATORS Ch II and Ch A	V.	

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5.3 Proof Cycle Test
Life Cycle

7413 1KS

Crystal Rectifier Rate Demodulator Z.F. Differential Amplifiers	Modul.e	Satisfactory Check	Unsatisfac hory Explain
Rate Demodulator L.F. Differential Amplifiers			8.2 Volts Adj. dropped to 2.2 Volts
Demodulator L.F. Differential Amplifiers	-	r	
Amplifiers	Demodulator	r	·
Temperature V 749 Low Bridges	-	V	749 Low

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5.3 Proof Cycle Test (Continued) Life Cycle

NOT REPRODUCIBLE

	Philippo.	
Modul⊕ -	Satisfactory check	Unsatisfactory Explain
Function Tone Generator		· 通過學學學
Commutator Power Supply	<i>V</i>	
Power Changeover Relay	V	
Commutator Command Relay	L .	·
Circuit Board Assembly	V,	

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5.3 Proof Cycle Test (Continued)

Like Cele

1.

MODULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBRATOR	<i>~</i>	
SUBCAHRIER OSCILLATORS Ch II and Ch A	in."	

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5.3 Proof Cycle Test

Life Cyche

Date 5/6/6/
Test Eng. Treesfor
Witness 10/0/04/1/19
USAF Witness
Start Time 2//3
End Time

Modul⊕	Satisfactory Check	Unsatisfacšory Explain
Transducer Power Supply	<i>L</i>	8,2 V. Adjust Peads 5,3 V
Crystel Rectifier	-	
Rate Demodulator	-	
Differential Amplifiers		CH 847 Low
Temperature Bridges	L	
		P. H. Toroster

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5.3 Proof Cycle Test (Continued)

Life Cycle

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	V	
Commutator Power Supply	~	·
Power Changeover Relay	L	
Commutator Command Relay	6	and the same
Circuit Board Assembly	<u> </u>	

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	440	7	

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5.3 Proof Cycle Test (Continued)

MODULE	SATISFACIORY CHECK	ungatisfactory explain
CALIBRATOR		
SUBCARRIER OSCILLATORS Ch II and Ch A	V	

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5.3 Proof Cycle Test
Life Cycle

Date 5/17/6/
Test Eng. Throater
Witness Walley
USAF Witness
Start Time 8/1/5
End Time

Modul•	Satisfactory Check	Unsatisfactory Explain
Transducer Power Supply		8,2 Volts Adj. Low
Crystal Rectifier	V	·
Rate Demodulator		
Differential Amplifiers		CH 748 Low
Temperature Bridges	V	· .

P. H. Torester

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Proof Cycle Test (Continued) Life Cycle

INOT REPRODUCIBLE

		INOT REPRODUCIB
Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	<i>\\</i>	
Commutator Power Supply	V	
Power Changeover Relay	7	
Commutator Command Relay	~	AN STATE STATE
Circuit Board Assembly		

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5.3 Proof Cycle Test (Continued) Life Cycle

MODULE	SATISFACIORY CHRCK	ungatisfactory explain
CALIBEATOR	, L	
SUBCARRIER OSCILLATORS Ch II and Ch A	Lum	

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5.3 Proof Cycle Test

Date 5/9/6/
Test Eng. Trops/ev
Witness TO Haille
USAF Witness
Start Time 8/1/5
End Time

Module	Satisfactory Check	Unsatisfaé s ory Explain
Transducer Power Supply	1	8,2 Volts Adj. 15 LOW - 4 VDC
Crystel Rectifier	v	
Rate Demodulator	-	
Differential Amplifiers		CH 748 Low
Temperature Bridges		
		R. W. Torrestor

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5.3 Proof Cycle Test (Continued) Life Cycle



NOT REPRODUCIBLE

Module	Satisfactory check	Unsatisfactory Explain
Function Tone Generator	←	All the Ale All
Commutator Power Supply		
Power Changeover Relay		
Commutator Command Relay	· bur	Marine Constitution of the
Circuit Board Assembly		

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5.3 Proof Cycle Test (Continued).

Life Cycle

MODULE	SATISFACTORY CHECK	unsatisfactory explain
CALIBRATOR	-	
SUBCARRIER OSCILLATORS Ch II and Ch A	~	

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的时间,我们还是这个时间,我们还是这种时间,也可以不会的人们,但可以不会的人们,也可以是有人的时间,我们也是不是一种,我们也是是是一种,也可以是这种时间,也可以不是

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FIRST 10.	PROTO NO.	PIGR NO.
1	66851 A	175
2	66858 A	176
9 .	67306 A	177

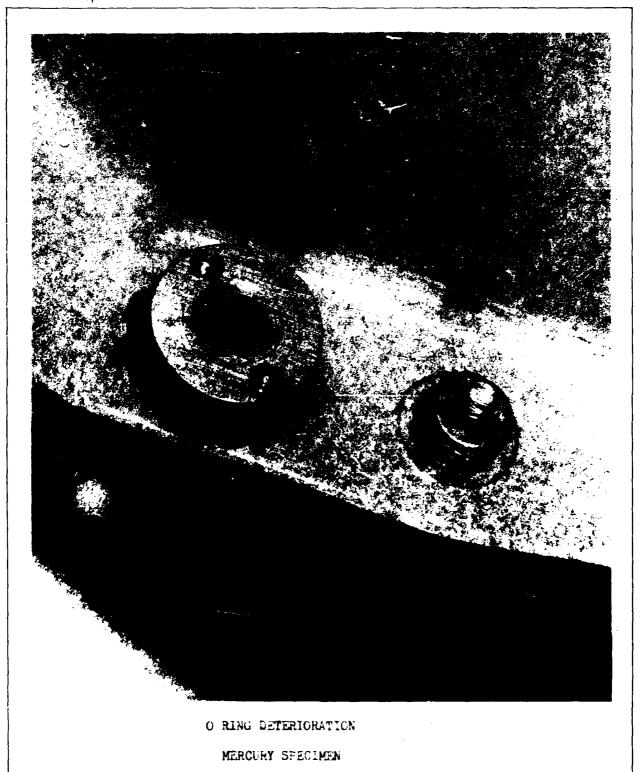
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Figure 1



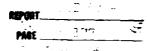
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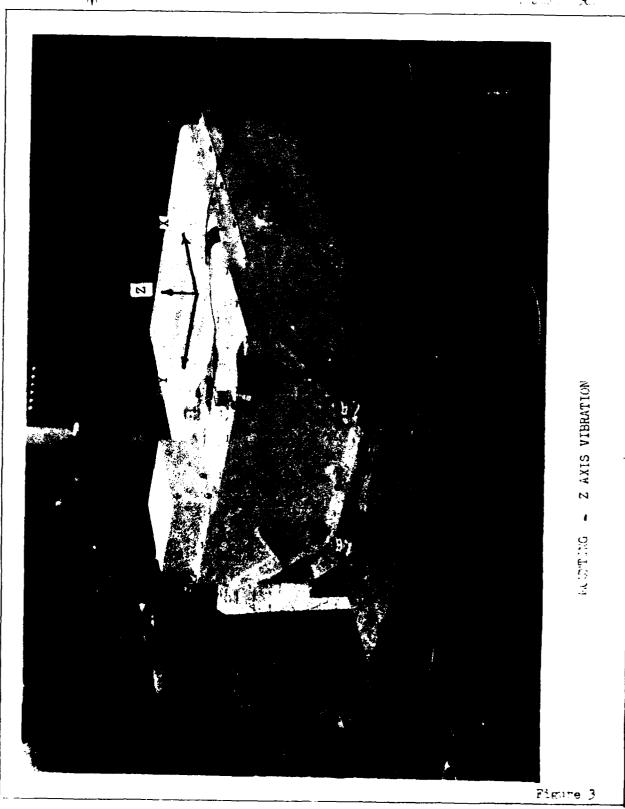
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CONVAIR DIVISION OF GENERAL DYNAMICS CORPORATION

PLIGHT PROOFING THAT PROCHURE

FOR

CINTAUR TELLLAK ASSEMBLY

UNIT 55-13503

R FORT NUBB'R 55B636

For S. B. Schwartz

CHECKED BY AND

I. D. Shilw

sst. Test Lab Group ingr.

Checks by // K

n. n. Hollenkepf outliffe then Coordinator

REVISIONS

APPROVED BY

DATE BY CHANGE

PAGES AFFECTED

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REPORT 558 636-1

11 July 1961

MEMO FOR THE RECORD

The following information shall be added to procedure 55B636.

Add to 3.2 Operating Requirements and Toleranees:

ATTAG	Totelande
Used on Mercury Units only)	
0-5.0 Wolts DC 6799-7901 aps	±.1 V ± 63 cps
6 - +2.4 Volts DC 18,700 - 25,300 cps	+ .1 V <u>7</u> 379 ope
ed on Moroury Units only)	
28 Volts DC 0-5 Volts DC Square Wave at a 1 cps repatition rate of 15-35 seconds duration	± 37 ± .2 7
	0-5.0 volts DC 6799-7901 sps 6 - +2.4 Volts DC 18,700 - 25,300 cps ed on Mercury Units enly) 28 Volts DC 0-5 Volts DC Square Wave at a 1 cps repetition rate of

Add to 5.2 Initial Satisfactory Performance Test:

5.2.12 Sub-Carrier Oscillators

Monitor output frequencies of each oscillator as the input voltage is varied in five steps over the full range.

5.2.13 Pre-Flight Calibrator

Monitor output waveshape with a 28 volt DC input signal.

Add 5.7 Radio Interference Test:

Radio Interference and Susceptibility Tests shall be conducted to determine compliance with applicable portions of MIL-I-26600. The Radio Interference Lab, Department 551-7 shall determine tests to be performed, designate test prints to be used and report test results to the Design Group.

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MEMO FOR THE RECORD: (Continued)

Add 5.8 Life Tests

The unit shall be operated under normal laboratory conditions to obtain 500 hours of operation. Four on-off cycles shall be completed each day. Each cycle shall consist of 5 hours "on time" and 1 hour "off time". The unit shall be operated through one proof cycle each day. Operating time during any other portion of the flight proofing test may be applied to the life test requirement. Any repair, adjustment, or maintenance of the unit during this test, unless specifically approved by the Design Group, shall cause the unit to be re-tested until 500 hours of maintenance free operation have been achieved.

Prepared by R.H. Torsester

R. H. Troester

Checked by William

Asat. Test Lab Group Engr.

Checked by

A. R. Mollenkopf Qualification Coordinator

Approved by

R. S. Campbell Chief of Test Labs

Approved by

F. T. Sinnott Design Group Engr.

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11 July 1961

MEMO FOR THE RECORD

The following information shall be added to Procedure 55B636. Replace 2.6 Sequence of Tests with the following:

The sequence of tests shall be as called out in the body of this report. This sequence may be varied due to time limitations, equipment availability or design considerations.

Prepared by R.H. Townster

Checked by the Tiller

Asst. Test Lab Group Eagr.

Checked by A. R. Mollenkopf 5/5,

Qualification Coordinator

Approved by

Chief of fest in

Approved by

F. T. Simnett Design Group Engr. (<u>•</u>

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1.0 PURPOSE:

The purpose of this report is to describe the test equipment and test procedure to be used in flight proofing of the Talepak Assembly Unit, Missileborne, 55-13503.

REFERENCES:

- a) 55-13503 Top Assembly Telepak Assembly.
- b) 55-13202 Schematic Telepak Assembly.
- e) 55-01125 Commutator Assembly Telepak Assembly.
- d) 55-13540-1 Transducer Power Supply Telepak Assembly.
- e) 55-13537-1 Crystal Rectifier Telepak Assembly.
- f) 55-13535-1 Commutator Power Supply Telepak Assembly.
- g) 55-13533-1 Limiter Filter Telepak Assembly.
- h) 55-13590 Demodulator Assembly Telepak Assembly.
- 1) 55-01104 Function Tone Generator Telepak Assembly.
- 1) 55-13557 Temperature Circuit Board Telepak Assembly.
- k) 55-13556 Limiter, Blip and Isolation Circuit Board Telepak Assembly.

2.0 SPECIAL INSTRUCTIONS:

The environmental tests prescribed in this procedure are written to conform to Convair Report No. 55-00200.

2.1 Namenclature:

Missileborne Telepak Assembly Unit 55-13503 shall be referred to in the body of this report as the "Test Specimen".

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2.0 SPECIAL INSTRUCTIONS: (Cent'd)

2.2 Adjustments and Repairs During Tests:

No adjustments, repairs, or maintenance shall be allowed during test runs except those not due to faults in design, materials, workmanship, or the test conditions imposed. If the unit does not perform satisfactorily during testing, the condition shall be noted and brought to the attention of the design group. Only at the discretion of the design group will testing be continued.

2.3 Test Data:

All data shall be recorded on data sheets such as those in Appendix A. All original data sheets shall be maintained in the System Test Lab files for a period of at least six months. Copies of the original data sheets shall be included in the final report describing the flight proofing tests.

2.4 Witnessing:

All tests covered by this procedure shall be witnessed by a Convair inspector, and the data sheets signed off in the appropriate spaces provided.

2.5 Atmospheric Conditions:

Unless otherwise specified, all tests called out in this procedure shall be performed at an atmospheric pressure between 28 and 32 inches of mercury, a temperature of between +60°F and +95°F, and a relative humidity of not more than 90%. Where tests are performed with atmospheric conditions substantially different from the specified values, proper allowance for changes in instrument readings shall be made to compensate for the deviation from the specified conditions.

2.6 Sequence of Tests:

The sequence of tests shall be as called out in the body of this report.

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2.0 SPECIAL INSTRUCTIONS: (Comt'd)

2.7 Tolerances:

The maximum allowable telerances on test conditions during environmental testing shall be as follows:

- a) Temperature plus or minus 40F
- b) Barometric Pressure plus or minus 5 percent
- c) Relative Humidity plus or minus 10 percent
- d) Vibration Amplitude plus or minus 10 percent
- e) Mibration Frequency plus or minus 2 percent
- f) Shock plus or minus 10 percent
- g) Acceleration plus or minus 10 percent

2.8 Measurments:

All measurements shall be made with instruments whose accuracies have been certified by the Astronautics Standards Laboratory, and which bear a current calibration decal.

2.9 <u>Temperature Stabilisation</u>:

Temperature stabilisation has been reached when the temperature of the largest centrally located mass of the unit does not vary more than 5°F from the temperature ambient to the unit.

3.0 TKST SPECDOM:

3.1 Description of Test Specimen:

The Telepak Assembly Unit is a device which is capable of converting instrumentation measurement signals into suitable inputs for a telemeter transmitter, and then transmit these signals. This is accomplished through the use of appropriate electronic sub-assemblies which perform the following functions:

a) DC voltage signal conversion and measurement.

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3.1 Description of Test Specimen: (Cont'd)

- b) Alternating current amplitude, and phase measurement.
- c) Transducer and measurement circuitry excitation.
- d) Temperature measurement
- e) Filter, limit and multiplex frequency measurements.
- f) Low level voltage amplification.
- g) Monitor ten "on-off" functions for single channel telemetry.

3.2 Operating Requirements and Tolerances:

PARAMETER	NOMINAL VALUE	TOLERANCE
Transducer Power Supply		
Input Voltage	+27.5 Volts DC	±10%
Output Voltage	-1.24 Volte DC, at 1 ma	±0.03 V.
Output Voltage	-6.0 Volts DC, at 5 ma	±1\$
Output Voltage	+2.5 Volts DC, at 0.05 ma	±0.006 V.
Output Voltage	+5.0 Volta DC, at 0.05 ma	±0.02\$
Output Voltage	+5.1 Volta DC, at 100 ma	±0.1 V.
Output Voltage	+5.2 Volta DC, at 50 ma	±0.1 V.
Output Voltage	4.5v to 8.8v DC at 50 ma	±0.25 ¥
Output Voltage	+8.8 Volts DC, at 300 ma	0.2 ¥

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3.2	Operating Requirements	and Tolerances: (Cont'd)	
	PARAMETER	VALUE	TOLERANCE
	Commutator Power Suppl	کا	
	Input Voltage	+27.5 Volts DC	<u>+</u> 10%
	Output Voltage	115 Volts AC	<u>+</u> 15%
	Output Frequency	400 CPS	±5%
	Output Load	0.6 P.F.	
	Comutators		
	Input Voltage	115 Volts AC, 400 CPS	<u>+</u> 1 5%
	Crystal Rectifier		
	Section A	•	
	Input Voltage	+20 to +35 Volts DC	<u>+</u> 1\$
	Output Voltage	±150 mv to +5 Volts DC	± 3%
	Section B		
	Input Voltage	105 to 125 Volts AC, 400 CPS - Phase A	<u>+</u> 1.75%
	Output Voltage	250 mv to +5 Volta DC	±5≸
	Section C		
	Input Voltage	105 to 125 Volta AC, 400 CPS - Phase B	±1.75≸
	Output Voltage	+250 mv to +5 Volte DC	±5 %
	Section D		
	Input Voltage	105 to 125 Volts AC, 400 CPS - Phase C	<u>+</u> 1.75%
	Output Voltage	±250 mv to +5 Volte DC	±5%

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3.2	Operating Requirement	nts and Tolerances: (Cont'd	1)
	PARAMETER	VALUE	TOLERANCE
	Differential Amplif	1ers	
	Section A	•	
	Input Voltage	0 to +100 mv DC	<u>+</u> 2 %
	Output Voltage	O to +5 Volts DC	<u>+</u> 2%
	Section B		
	Input Voltage	0 to 100 mv DC	±2%
	Output Voltage	O to +5 Volts DC	±2 %
	Demodulators		
	Input Voltage	0 - 0.125 Volts AC, 400 CPS	<u>+</u> 1%
	Output Voltage	±40 mv to 5 Volts DC	±2%
	Filter Assembly - L	imiter	
	Channel 1		
	Input Voltage	115 Volts AC 400 CPS, Phase A	±1%
	Output Load	160 K Ohms	
	Output Voltage	0.096 Volts AC	±4%
	Output Frequency	400 CPS	±30 Cycles
	Channel 4		
	Input Voltage	As in Figure 1	<u>+</u> 1\$
	Output Load	160 K Ohms	
	Output Voltage	0.096 Volta AC	±4%
	Output Frequency	5400 CPS	±405 Cycles

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5	Operating Requirements and Tolerances: (Cont'd) NOMINAL		nt d)
	PARAMETER	VALUE	TULEHANCE
	Function Tone Gener	<u>nior</u>	
	Channel 1		
	Input Voltage	+27.5 Volts DC	±10%
	Output Voltage	0.079 Volta AC	<u>+</u> 10%
	Output Frequency	33 CPS	±5 CPS
	Channel 2		
	Input Voltage	+27.5 Volta DC	±10%
	Output Voltage	0.079 Volte AC	<u>+</u> 10\$
	Output Frequency	74 CPS	±5 cps
	Channel 3		
	Input Voltage	+27.5 Volte DC	±10%
	Output Voltage	0.128 Volts AC	±10%
	Output Frequency	115 CPS	±5 CPS
	Channel 4		
	Input Voltage	+27.5 Volts DC	±10%
	Output Voltage	0.171 Volta AC	±10%
	Output Frequency	156 CPS	₩ CPS
	Channel 5		
	Input Volte	+27.5 Volta DC	±10%
	Output Voltage	0.220 Volta AC	110%
	Output Frequency	197 CPS	t to CPS

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3.2	Operating Requirement		(Cont'd)
	PARAMETER	NOMINAL VALUE	TOLERANCE
	Channel 6		
	Input Voltage	+27.5 Volta DC	<u>+</u> 10%
	Output Voltage	0.272 Volts AC	±10%
	Output Frequency	238 CPS	±5 CPS
	Channel 7		
	Input Voltage	+27.5 Volta DC	±10%
	Output Voltage	0.321 Volts AC	<u>+</u> 10%
	Output Frequency	279 CPS	±5 CPS
	Channel 8		
	Input Voltage	+27.5 Volts DC	<u>±</u> 10%
	Output Voltage	0.357 Volta AC	±10%
	Output Frequency	320 CPS	±5 CP3
	Channel 9		
	Input Voltage	+27.5 Volta DC	±10%
	Output Voltage	0.410 Volta AC	±10%
	Output Frequency	361 CP9	±5 CPS
	Channel 10		
	Input Voltage	+27.5 Volta DC	<u>±</u> 10\$
	Output Voltage	0.452 Volts AC	±10%
	Output Frequency	402 CPS	±5 CPS

3.2		nominaL	
	PARAMETER	VALUE	TOLEFANCE
	Circuit Board Assen	bly	
	Limiter Section		
	Input Voltage	-1.25 to +5.0 Volta DC	<u>+</u> 1\$
	Output Voltage	Shall vary linearly with input from -1.25 volts to 5.0 volts ±0.1 volt. For input below -1.8 volts or above 6.0 volts, the output shall not vary more than -0.1 volt or +0.2 volt from the limits of -1.8 volts or 6.0 volts DC	
	Blip Section		
	Input Voltage	+27.5 Volta DC	±10%
	Output Voltage	+5.25 Volts DC, Decaying exponentially to sero	<u>+</u> 2\$
	Divider Section		
	Input Voltage	-1.25 Volts DC	±3%
	Output Voltage	-1.0 Volta DC	Minimum
	Output Load	l meg ohm	Minimum
	Temperature Board		·
	Input Resistance	Proper value to simu- late appropriate trans- ducer	
	Output Voltage	0 to +100 mv	±2%

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3.2 <u>Greating Requirements and Tolerances</u>: (Cont'd)
NOMINAL

PARAMETER

VALUE

TOLERANCE

Power Changeover Switch and Command Relays

Input Voltage

+27.5 Volta DC

+10%

- 4.0 TEST FACILITIES AND TEST ECUIPMENT:
- 4.1 Environmental Test Fourment:
- 4.1.1 <u>Vibration Equipment</u>

MB Model C-25H vibration system, or equivalent, together with suitable monitoring and recording equipment.

4.1.2 Temperature - Altitude - Humidity Rouisment:

BENCO Environmental Chamber, Model WFA-100-45, or equivalent.

4.1.3 Acceleration Test Equipment:

Genisco Rotary Accelerator, Model C-159, or equivalent.

4.2 Initial Satisfactory Performance Test Equipment:

The following test equipment or equivalent shall be used.

- a. Digital Voltmeter, Electro Instruments, Model 41R.
- b. DC Power Supply, Hewlett Packard, Model 712B
- c. DC Power Supply, Magnetic Research Corporation, Model MR-28-5.
- d. AC Power Supply, Behlman Engineering Corporation, Model 253C-1.
- e. Recorder, Sanborn Company, Model 150
- f. Recorder, Midwestern Instruments, Model 591
- g. Oscilloscrope, Tektronic Inc., Model 315R
- h. Wave Analyser, Hewlett Packard, Model 302-A

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- 4.3 Proof Cycle Test Rouisment
 - a. Same as in paragraph 4.2
- 5.0 TEST CONDITIONS AND PROCEDURES:
- 5.1 Preliminary Inspection:

The test specimen shall be examined visually prior to any test to determine that the specimen meets the requirements of workmanship, identification markings, external dimensions, and proper inspection approval.

5.2 Initial Satisfactory Performance Test:

> The initial satisfactory performance test (ISPT) shall be performed prior to any environmental tests. If the specimen fails any test, for any resson, and must be adjusted or repaired, an initial satisfactory performance test shall be performed before testing is resumed.

- 5.2.1 Preparation for Testing:
- 5.2.1.1 Connect the test specimen with the correct power sources and associated test equipment.
- 5.2.1.2 Turn on test equipment power switches and allow 20 minutes warm up time.
- 5.2.1.3 Turn on power switches to test specimen.
- 5.2.2 Transducer Power Supply
- 5.2.2.1 Monitor output voltages, and output noise voltage with input voltages of +24.75, +27.5 and +30.25 volts DC.
- 5.2.3 Crystal Regtifier
- 5.2.3.1 Section A

Monitor output voltage and output noise voltage as input is varied from +20 to +35 volts DC, +15, in 5 volts increments.

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- 5.2.3 Crystal Rectifier (Cont'd)
- 5.2.3.2 Section B

Monitor output voltage and output moise voltage as input voltage is varied from 105 to 125 volts AC, +1%, in 5 volta increments.

5.2.3.3 Section C

Same as paragraph 5.2.3.2

5.2.3.4 Section B

Same as paragraph 5.2.3.2

- 5.2.4 Rate Demodulator
- 5.2.4.1 Monitor output voltage, and output noise voltage as input varies from 0 to 0.125 volts AC, ±1%, in 5 steps. Input is in phase with 115 voltAC reference voltage applied to demodulator.
- 5.2.4.2 Repeat 5.2.4.1, except input is 180° out of phase with reference voltage.
- 5.2.5 Differential Amplifiers
- 5.2.5.1 Section A

Monitor output voltage, and output noise voltage as input voltage varies from 0 to +100 mv DC.

5.2.5.2 Section B

Same as paragraph 5.2.5.1

- 5.2.6 Temperature Bridges
- 5.2.6.1 Complete each temperature bridge with a resistance that will simulate an appropriate transducer.
- 5.2.6.2 Monitor output voltage.

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5.2.7	Limiter - Ri	in Board
3.4.1		LU ABBANA

5.2.7.1 Blip Circuit

Homiter output voltage with an input voltage pulse of +27.5 volta DC, $\pm 10\%$.

5.2.7.2 Limiter Section

Monitor output voltage as input voltage varies from -3 to +7 volts, +1%, in 2 volt increments.

5.2.7.3 Divider Circuit

Monitor output voltage.

- 5.2.8 Function Tone Generator
- 5.2.8.1 Turn on each tone oscillator, one at a time, and monitor; output voltage, and output frequency.
- 5.2.8.2 Turn on all tone oscillators and monitor output voltage of each oscillator.
- 5.2.9 Computator Power Supply
- 5.2.9.1 Monitor output voltage with input voltages of +24.75, +27.5 and +30.25 volta DC.
- 5.2.10 Power Changeover and Command Relays:
- 5.2.10.1 Energise each of the relays with +27.5 volts DC and then de-energise. Monitor TIM output and commutator wiper.
- 5.2.11 Filter Assembly Limiter:
- 5.2.11.1 Monitor output voltage with an input of 115 volta AC, $\sqrt{}$ 400 CPS, and with an input as in Figure 1.
- 5.3 Proof Circle Tests

The proof cycle test for this unit consists of the following sequence of operation.

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5•3	Proof Crais Touts (Contld)
7.5	Froof Cycle Test: (Cont'd)
5.3.1	Preparation for Testing:
5.3.1.1	Connect the test specimen with the correct power sources and associated test equipment.
5.3.1.2	Turn on test equipment power switches and allow 20 minutes warm up time.
5.3.1.3	Turn on power switches to test specimen.
5.3.2	Testing:
5.3.2.1	Adjust all input voltages within the limits called out in Section 3.2.
5.3.2.2	Monitor output voltages and output noise voltages of every module within the system to determine compliance with Section 3.2.
5.4	Vibration Test:
	The test specimen shall be justifected to a proof cycle, as called out in Section 5.3, after each vibration test.
5.4.1	Sinusoidal Vibration
	While operating, the unit shall be subjected to a slow speed scanning sweep, at frequencies and amplitudes of sinusoidal vibration as shown in Figure 2, and a sweep period as shown in Figure 3 along each of any three mutually perpendicular axes of the test specimen.
5.5	Temperature-Altitude- Humidity Tests:
	The following test sequence shall be conducted in a temperature-altitude-humidity test chamber in the order specified. A thermo couple shall be placed with good

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5.5 Temperature-Altitude-Humidity Testa: (Cont'd)

thermal contact on the largest centrally located internal mass within the unit, or in any other location deemed necessary to check temperature stabilisation.

- The unit shall be placed within the chamber and the specimen temperature shall be stabilized and maintained at plus 125°F for a period of one hour. The chamber temperature shall be maintained and the specimen shall be subjected to radiant heat at the rate of 360/BTU/sq./ft./hr. upon its largest surface area for a period of four hours. The maximum unit temperature during this period shall be determined and where indicated in the following tests by the term "maximum non-operating temperature", used in conducting tests.
- b. The chamber temperature shall be reduced to -30°F, at a rate of 0.75 to 1.25°F per minute, and maintained at this temperature for a period of not less than eight hours, or until unit temperature stabilises, whichever is longer. During or at the end of the period, the chamber absolute internal pressure shall be reduced to 3.44 inches of mercury for a period of at least one hour and then returned to approximately thirty inches of mercury. The test specimen shall then be operated through one proof cycle while supplied with sufficient cooling or heating air to maintain the test specimen skin temperature at OOF, and a record made of all data necessary to determine compliance with the proof cycle requirements of this procedure.
- c. The chamber temperature shall be increased at a rate of 0.75 to 1.25°F per minute to maximum nonoperating temperature, or 160°P, whichever is greater, and maintained with a relative humidity of not less than 95 percent, for a period of four hours, or until test specimen temperature stabilises, whichever is longer. At the end of this period the chember internal absolute pressure shall be reduced to 3.44 inches of mercury for a period of at least one hour, and them returned to approximately thirty inches of mercury.

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5.5 <u>Temperature-Altitude-Humidity Testa</u>: (Cont'd)

c. (Cont'd)

During this period of one hour, relative humidity may be decreased, but shall be returned to 95 percent at a pressure of thirty inches of mercury. The chamber shall then be allowed to return to smbient temperature until the test specimen temperature stabilises. The test specimen shall be operated through one proof cycle while supplied with sufficient heating or cooling air to maintain the test specimen skin temperature at 110°F, and a record made of all data necessary to determine compliance with the proof cycle requirements of this report. Immediately following, the test specimen shall be operated while the chamber internal absolute pressure is reduced to not more than 0.1 micron of mercury as rapidly as possible (no humidity control), and a record made of all data necessary to determine compliance with the proof cycle requirements of this report.

- d. The chamber absolute pressure shall be returned to 30 inches of mercury and the chamber temperature shall be returned to plus 40°F at a rate of 0.75 to 1.25°F per minute, and a relative humidity of not less than 95 percent, and maintained for a period of not less than 4 hours, or until the unit temperature stabilizes, whichever is longer. At the end of this time, the unit shall be operated, and a record made of all data necessary to determine compliance with the proof cycle requirements of this procedure.
- e. The unit shall be placed within the chamber and the chamber maintained at a temperature of 70°F for a period of at least one hour, or until the unit temperature stabilises. The unit shall then, within a period of 2 minutes, be placed in a chamber whose temperature is at maximum non-operating temperature, or 160°F, whichever is greater, and maintained at this temperature for a period of one hour, or until temperature stabilises. The unit shall then, within a period of 2 minutes, be placed in a chember whose temperature is minus 30°F, and maintained at this temperature until the unit temperature stabilises. The unit shall then be returned to room ambient conditions and examined for evidence of deterioration, and operated to determine compliance with the proof cycle requirements of this procedure.

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5.6 Acceleration Test:

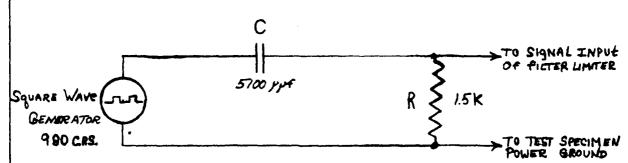
The test specimen shall be subjected to the following tests while operating. A record shall be made of all data necessary to determine compliance with the proof cycle requirements of this precedure prior to and immediately following completion of this test.

a. The unit shall be subjected to 10.0g for a period of at least 30 seconds, along each of three mutually perpendicular axes of the unit.

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FILTER LIMITER-INPUT SIGNAL



Application of a square wave to the RC differentiating Circuit Will RESULT IN A SPIKED WAVE-FORM ACROSS THE 1.5 K RESISTOR AS BELOW.

